



Air Force *Modeling & Simulation*

The logo features the Air Force seal in the center, surrounded by a circular border containing the text "DEPARTMENT OF THE AIR FORCE" at the top and "UNITED STATES OF AMERICA" at the bottom. The year "MCMXLVII" is also visible. The background is a dark blue with a grid pattern and several stylized aircraft flying across it.

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Command and Control Directorate
DCS Air & Space Operations

Purpose and Scope

**Discuss Air Force Modeling and Simulation
in the context of today's Expeditionary
Aerospace Force**

- ➡ The Expeditionary Challenge
- ➡ M&S Vision
- ➡ Domains and Objectives

The Problem: A Changing “Sight Picture”



- ➡ Cold War Air Force - Focused on *Containment*
 - ➡ Garrison State -- robust basing and manning
 - ➡ Operating from bases with large infrastructures
- ➡ 21st Century Air Force - Focused on *Engagement*
 - ➡ Reduced force structure and fewer forward locations
 - ➡ Austere operating bases with limited infrastructure
 - ➡ Still forward based, but *Responding Globally*
 - ➡ Integrated Force Protection & Agile Logistics

Requires an Expeditionary Approach

We Must Evolve in a Way That...



- Meets National Needs
- Ensures Joint Effectiveness
- Leverages AF Strengths
- Uses the Total Force

***Requirements to meet
the National Military
Strategy with . . .***

Relevant Forces

- Rapidly responsive
- Trained and ready
- Modern and capable
- Lean and agile
- Appropriately structured

**Expeditionary
Aerospace
Force**

***We are operating
in a . . .***

Constrained Environment

- Fiscal limits
- Political realities
- TEMPO demands
- Qlty of life needs
- Readiness challenges

**Creating a Better 21st Century Air Force
Maintaining Continuity of Purpose**

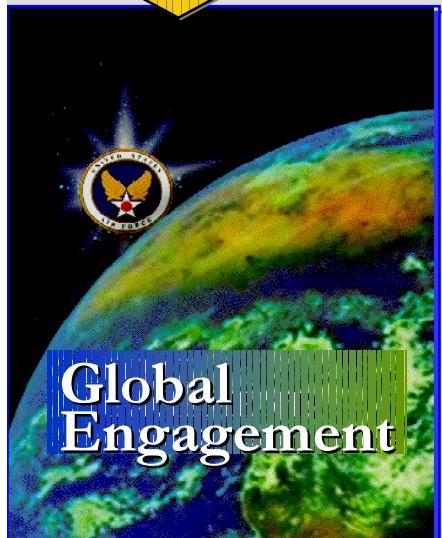
Joint and Service Vision



National
Military
Strategy

of the United States of America

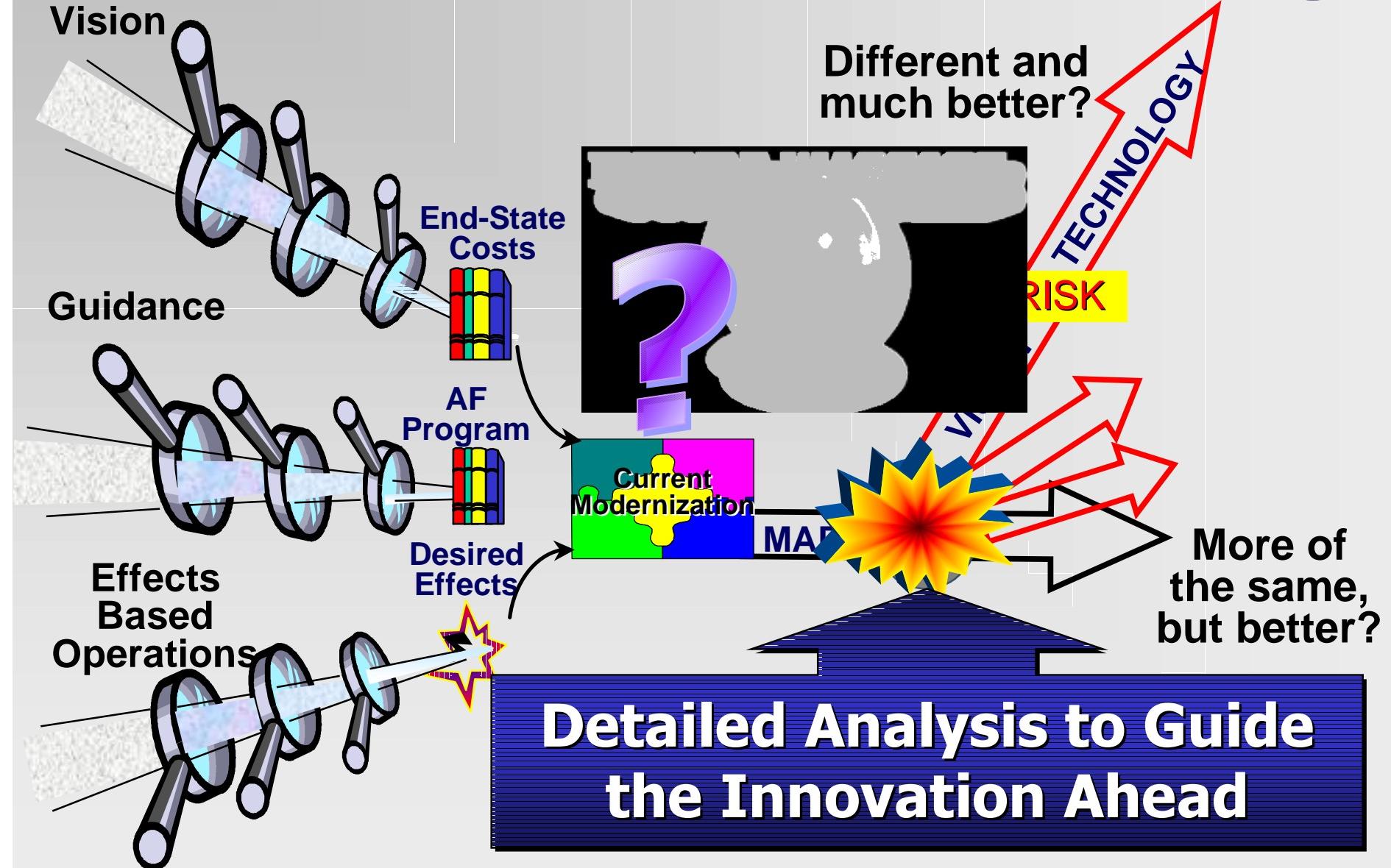
Full Spectrum Dominance
*DEFEND, PREPARE NOW:
A MILITARY STRATEGY FOR A NEW ERA*



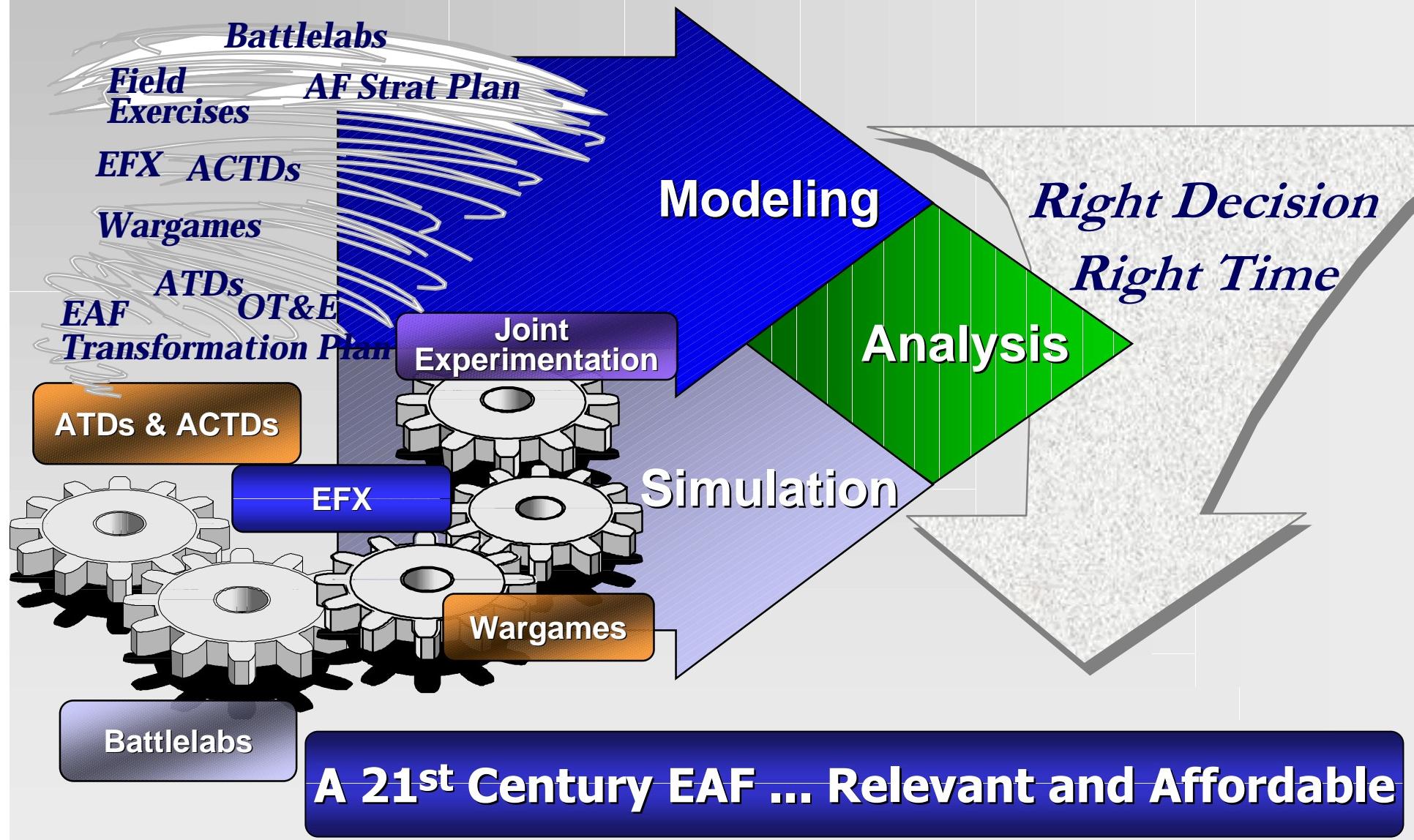
USAF Core Competencies

Air and Space Superiority
Information Superiority
Global Attack
Precision Engagement
Rapid Global Mobility
Agile Combat Support

The Analytic Nexus



AF Modeling, Simulation & Analysis Integration



The M&S Vision

... a Joint Synthetic Battlespace



- ➡ Supporting multiple functional areas
- ➡ Through Live, Virtual, and Constructive Simulation
- ➡ With Joint, Interoperable, Re-useable models

DOMAINS OF MS&A

MS&A STRATEGIC OBJECTIVES



ANALYSIS

Accurate Aerospace Capability Analysis

- Ensure MS&A capabilities capture the capacity of modern Air and Space power as critical components required to meet the challenges of the world environment as US military force structure is molded to support current and emerging national military strategy

ACQUISITION

Optimized Weapon Systems

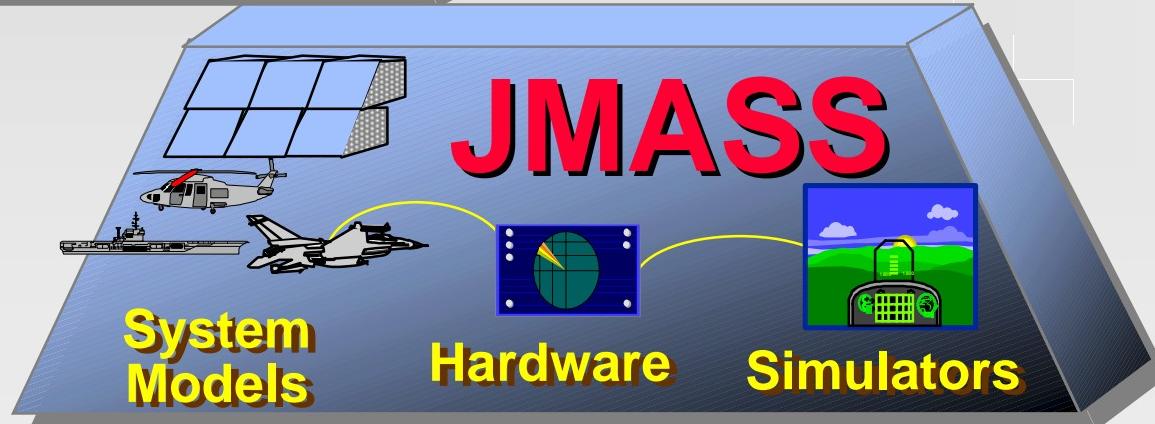
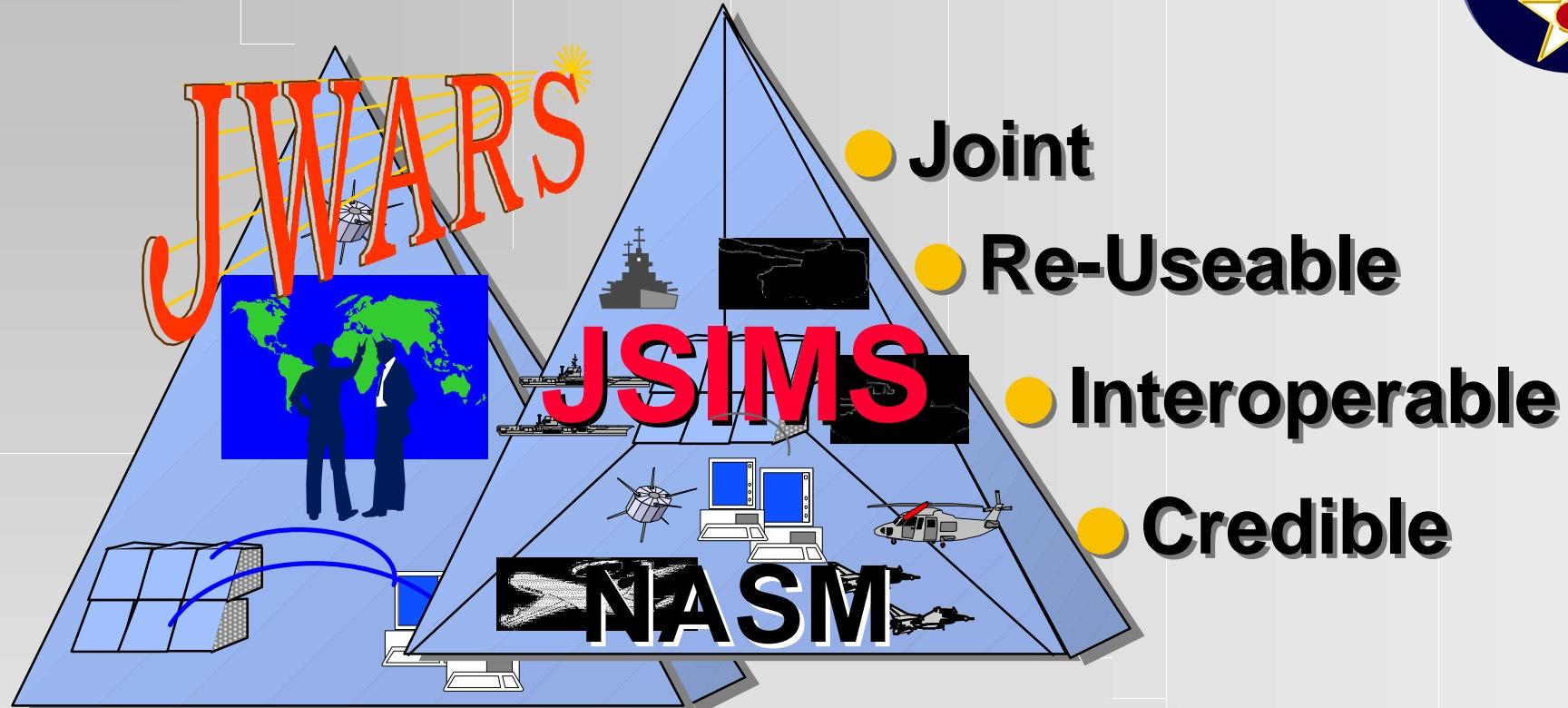
- Apply MS&A as a means to objectively and consistently compare, evaluate, perform trade-off analysis, and review current and proposed military weapon systems' capabilities against existing and emerging threats throughout a weapon system's life-cycle [all phases of acquisition and sustainment.]

TRAINING

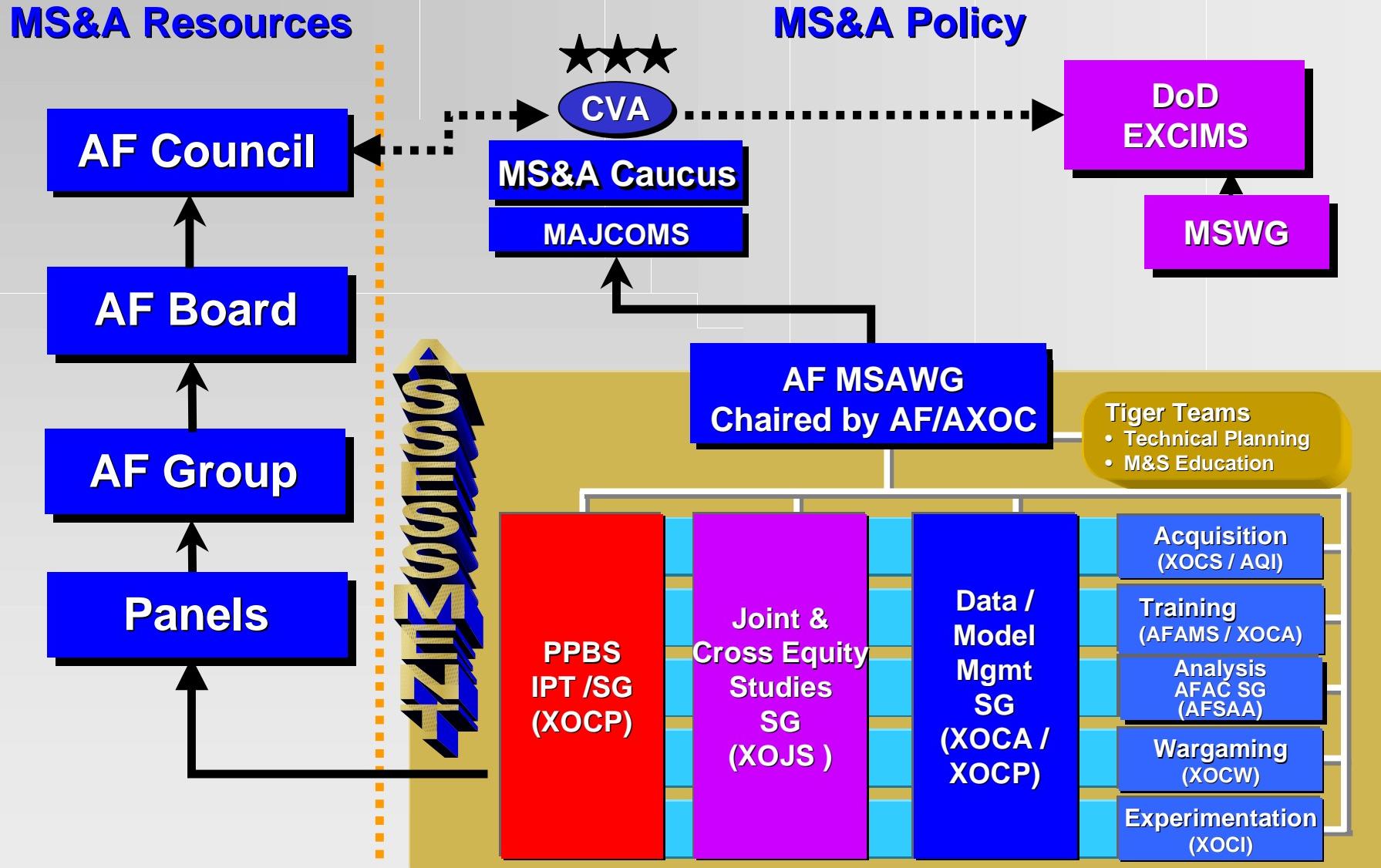
Combat Ready Forces

- Utilize MS&A capabilities to support US combat and combat support personnel readiness to meet the challenges of military employment in peace time and throughout the conflict spectrum.

Next Generation Joint Models



AF MS&A Caucus Structure



AF Standard Analysis Toolkit

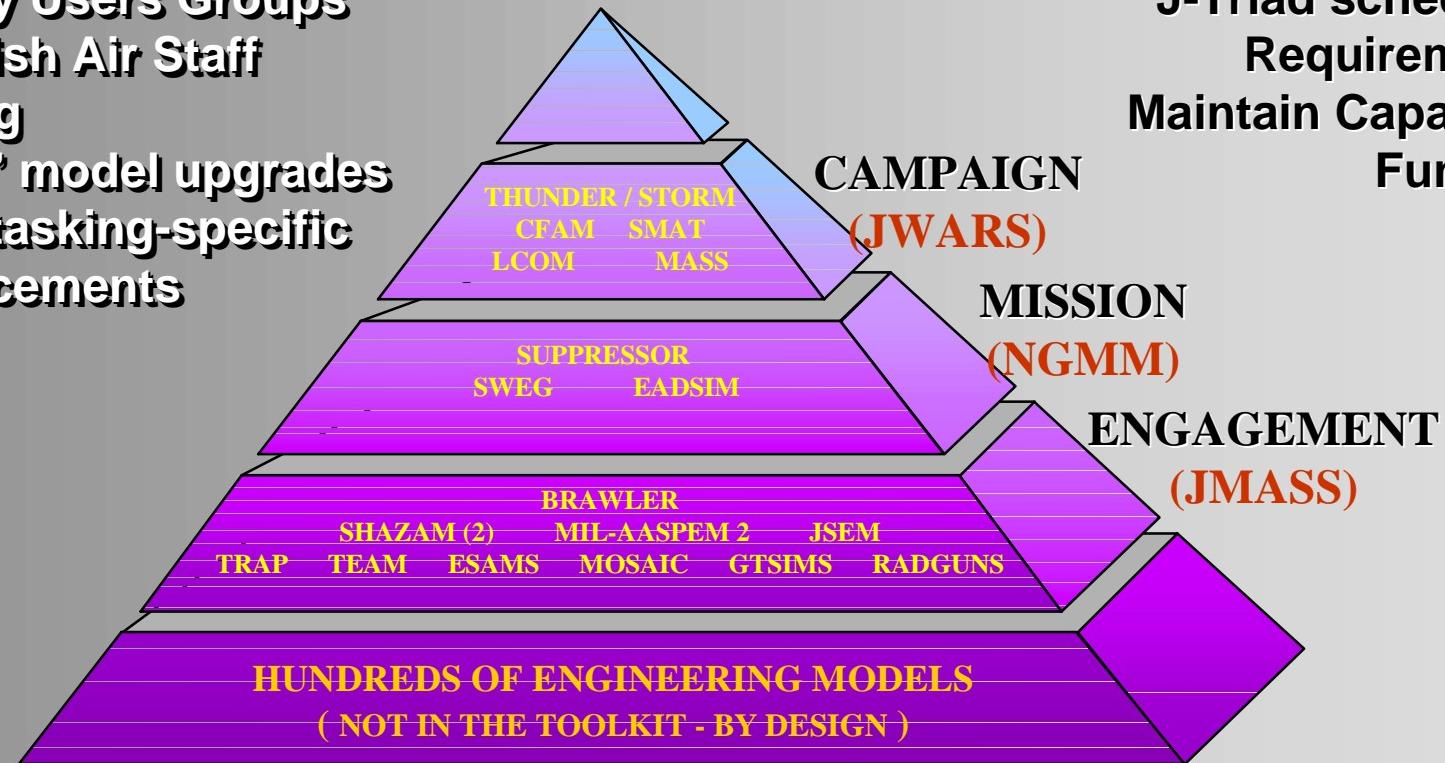


Transition Plan

- ➡ Identify Users Groups
- ➡ Establish Air Staff funding
- ➡ “Lock” model upgrades
- ➡ Allow tasking-specific enhancements

Issues

- J-Triad schedules
- Requirements
- Maintain Capability
- Funding

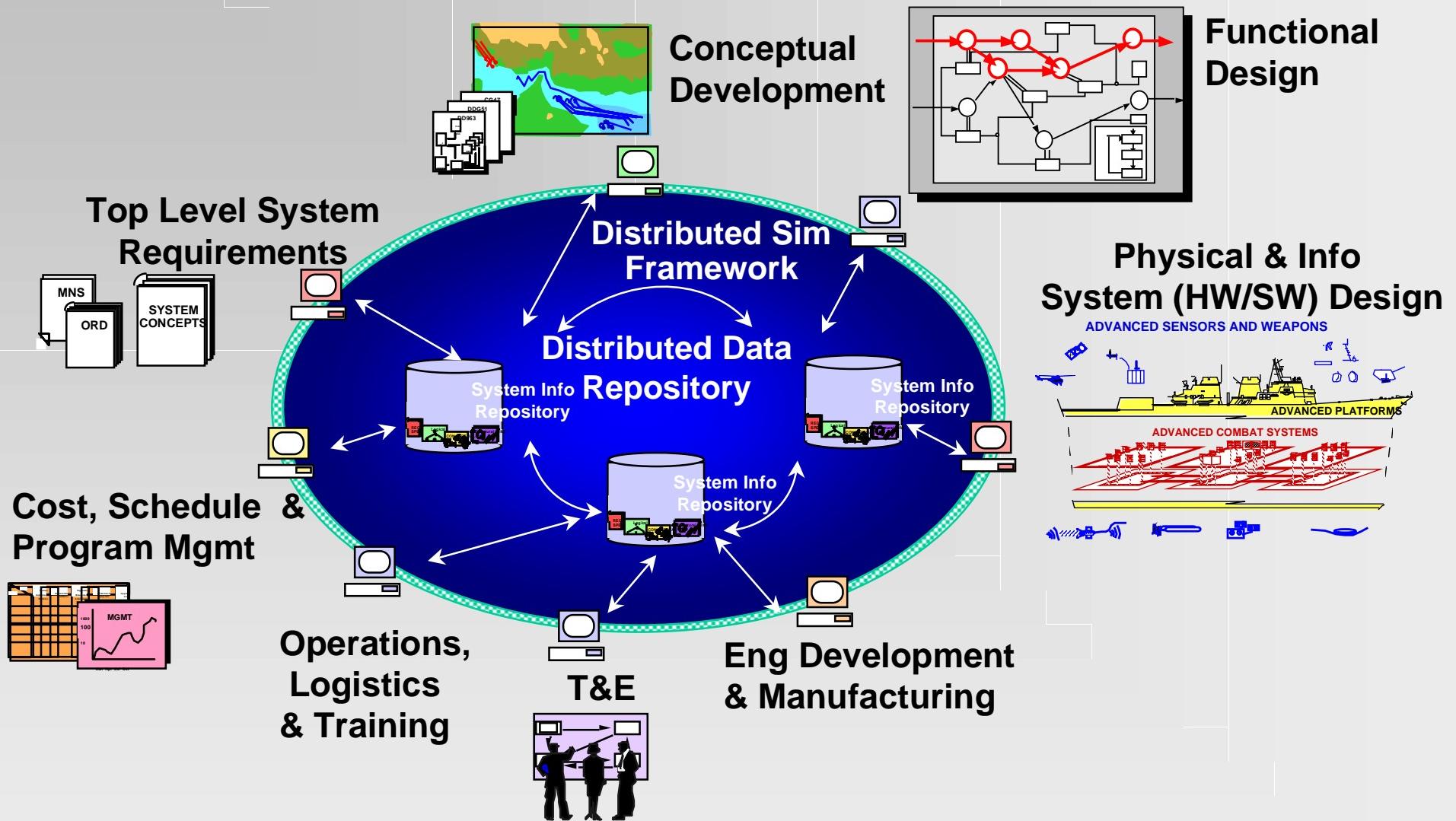


Requirements

Acquisition

Test & Evaluation

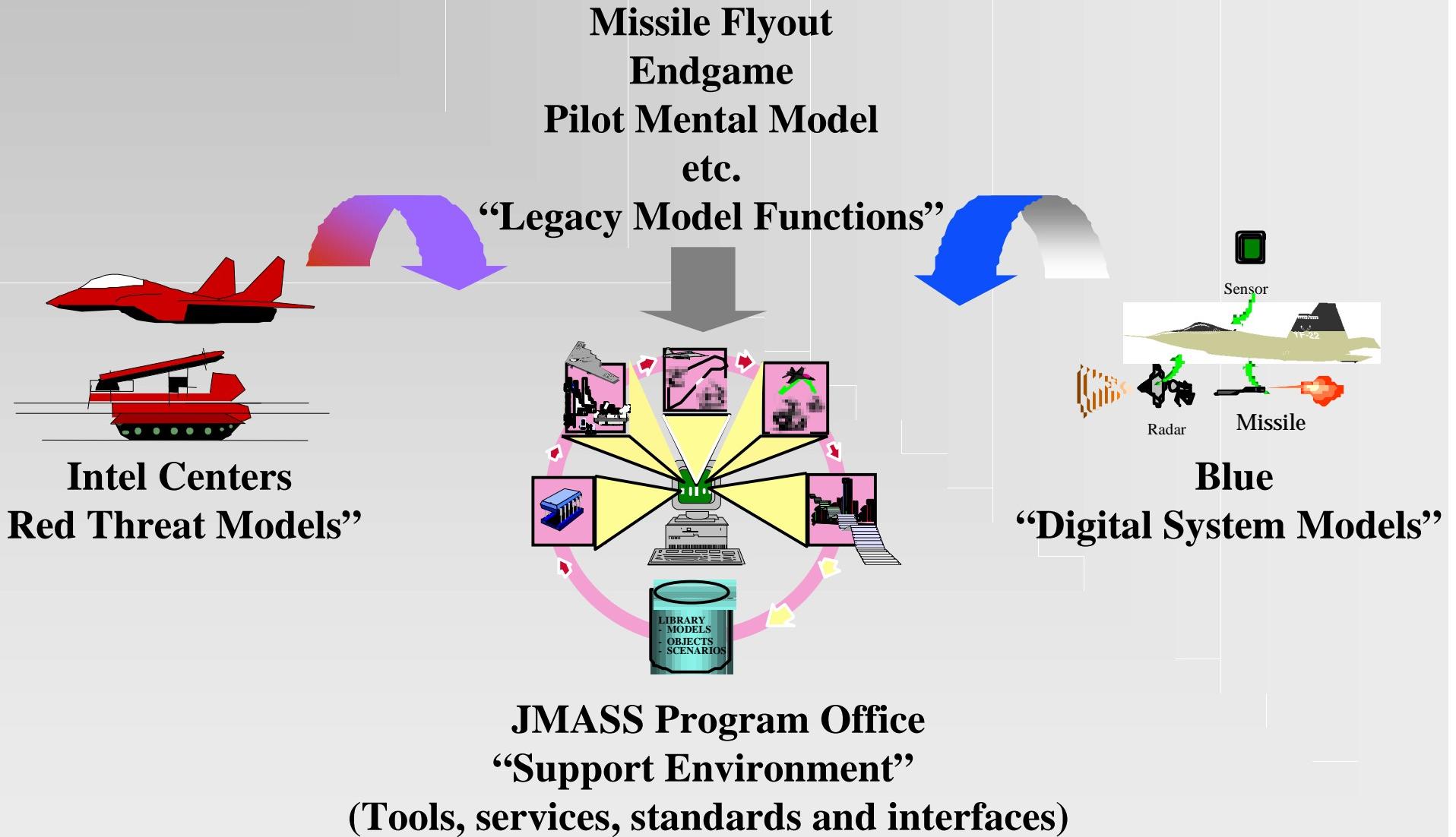
OSD's SBA Operational Concept



Extensive Re-use Across Phases and Across Acquisition Programs



Populating JMASS



DRAFT **Transitioning to JMASS**
Legacy Model Functions



Missile Flyout

End Game

Generic
Helicopters

Generic
Air Targets

RF Missiles

IR Missiles

AAA

IR Environment

Radar/OP

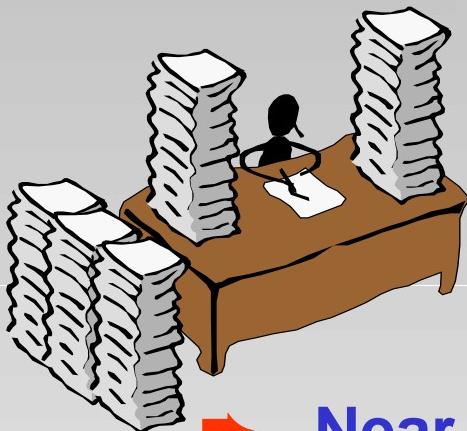
Pilot Mental
Model

RF Environment

ECM
Modeling Tools

**Robust
JMASS
Environment**

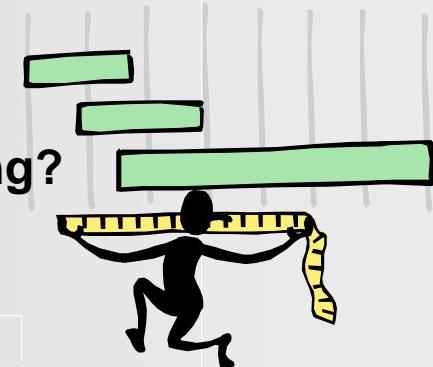
Scoping JMASS: Blue Digital System Model (DSM) Requirements Survey



- Over 800K Air Force End Items
 - We don't **NEED** DSMs for **ALL** of them!
 - We can't **AFFORD** them all!
 - Which are the critical ones?

Near Term Requirement Study

- Where are the big money decisions coming?
- What DSMs are needed for them?



- The Initial Answer:
 - 48 DSMs
 - 6 for JMASS

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TRAINING

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C2 Training Environment



“The basis of readiness is a combined and joint exercise program....”

**General John H Tilelli, Jr, USA
CINC, Combined Forces Command**

Yearly C2 Training Impact:

- Over 3000 AF warfighters
- Over 4000 Sister Service warriors
- Over 14,000 coalition partners
 - ... in readiness exercises
 - ... in multiple scenarios
 - ... immersion through M&S

***Modeling and Simulation
(M&S) Creates Environment***



“M&S has improved air component readiness.”

Lieutenant General Hurd, 7th AF/CC



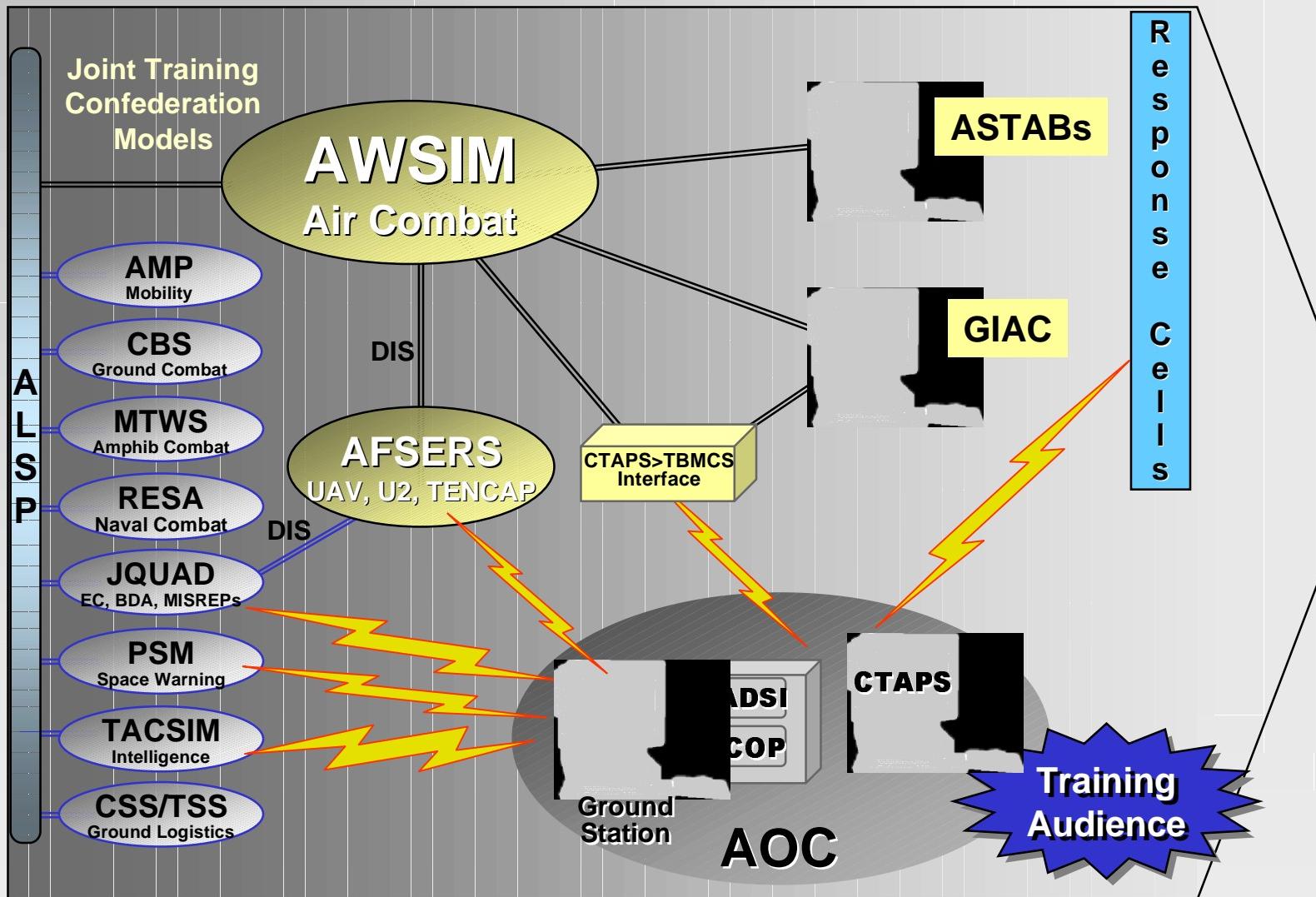
C2 Training Environment

Modeling and Simulation (M&S) Creates Environment

- ➔ Role of training environment: stress people, equipment, processes
- ➔ During EFX 98, M&S provided
 - ➔ 2,500 USMTF intel messages per day through TBMCS
 - ➔ 2,106 mission updates per day through TBMCS
 - ➔ 12,677 TADIL J, TIBS, TRAP messages via C4ISR every 10 min
 - ➔ With an average of 420 sorties per day
- ➔ Typically, UFL and Blue Flag include 2000-3000 sorties/day

Train the way we expect to fight....and win

AFSOM / Joint Training Confederation

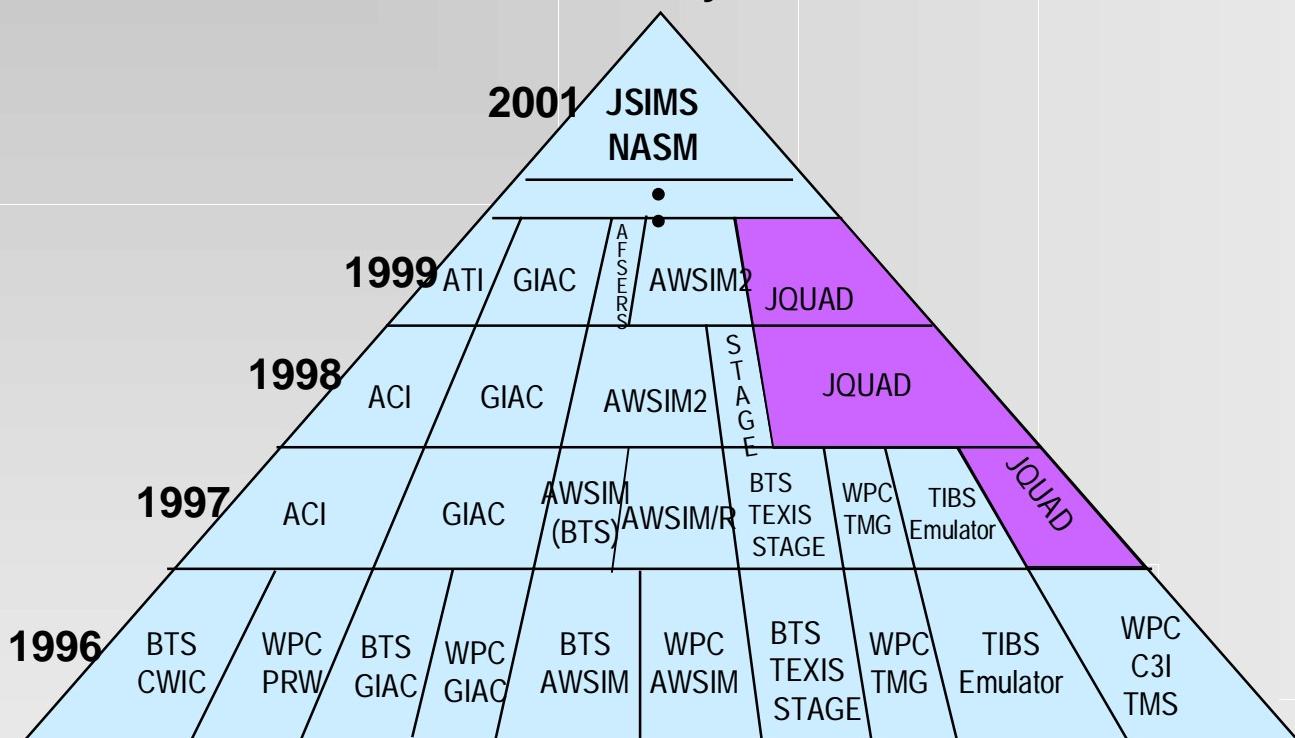


M&S for C2 Training

Today: AF Suite of Models (AFSOM)



- Standard AF suite of C2 training models
- Baseline training tools
- Reduced models from 10 to 4
- Improved C2 training via AWSIM changes
- Added ISR functionality



Various simulations for readiness training used since 1980s

M&S for C2 Training



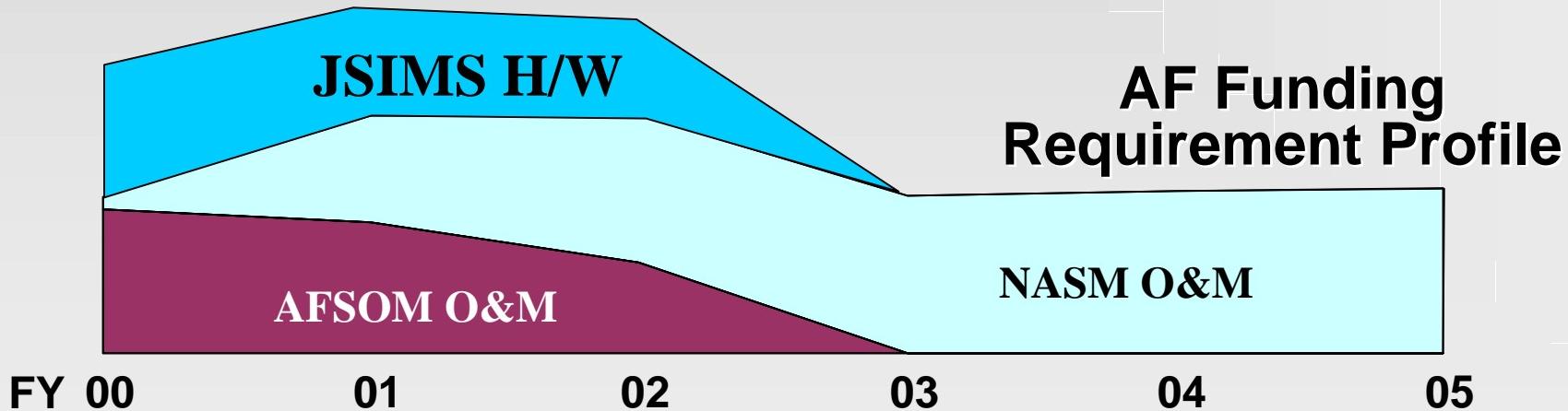
Tomorrow: Joint Simulation System (JSIMS)



- Increased realism
- Better training
- Improved readiness

M&S Transition Plan

	FY00	FY01	FY02	FY03	FY04	FY05
TB	JTLS	JTLS	JTLS	JSIMS	JSIMS	JSIMS
UE	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS	JSIMS
SG	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS
YS	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
BF-2	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
UF	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
PW	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS
RS	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS	JSIMS
TMDI		JSIMS	JSIMS	JSIMS	JSIMS	JSIMS
UFL	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
EFX	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
BF-4	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS



Distributed Mission Training (DMT)



Provide **aircrews** a realistic, fully integrated environment, capable of supporting the entire spectrum of training from individual up to campaign-level mission rehearsal



DMT Concept of Operations

Team training and mission rehearsal to support operational commanders



► Team training - Wing/Squadron

- RAP requirements
- Realistic battlespace based on unit's training needs (local area, expected theaters, challenging adversary)



Team Training

► Mission rehearsal - AEF/JFACC

- Based on mission essential tasks derived from real-world mission
- Replicate mission battlespace conditions (terrain, weather, imagery, opposition forces)

DMT

Mission Rehearsal



Questions?

How Air Force M&S supports the Challenges

- ➡ The Expeditionary Challenge
- ➡ M&S Vision
- ➡ Domains and Objectives